Definition of ‘project’

- They are non-routine endeavours with a clear life cycle (e.g. Maylor’s ‘define it, design it, do it, develop it’)
- Projects are building blocks in the design and execution of long-term organisational strategies
- Project management stretches across functional and entity boundaries (project team members may even be drawn from outside the organisation)
- The principal outcomes of a project are the satisfaction of customer requirements within the constraints of technical, cost, and schedule objectives
- Projects are terminated upon successful completion of performance objectives (‘programmes’ are ongoing)
### ‘Project management’ v ‘General management’

<table>
<thead>
<tr>
<th>General Management</th>
<th>Project Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manages the status quo</td>
<td>Oversees change</td>
</tr>
<tr>
<td>Management structure defines authority</td>
<td>Lines of authority unclear</td>
</tr>
<tr>
<td>Consists set of tasks</td>
<td>Set of tasks change frequently</td>
</tr>
<tr>
<td>Responsibility limited to own function</td>
<td>Cross-functional activities</td>
</tr>
<tr>
<td>Works in permanent organisational structures</td>
<td>Operates within structures that exist for the life of the project</td>
</tr>
<tr>
<td>Tasks are described as maintenance</td>
<td>Concerned with innovation</td>
</tr>
<tr>
<td>Optimisation is main task</td>
<td>Conflict resolution is main task</td>
</tr>
<tr>
<td>Achieving interim targets determines success</td>
<td>Achieving stated end goals determines success</td>
</tr>
<tr>
<td>Unlimited set of variables</td>
<td>Contains intrinsic uncertainties</td>
</tr>
</tbody>
</table>
There are a number of competing international systems trying to standardise project management, e.g.

- Association for Project Management (UK Professional);
- Projects in Controlled Environments (UK Govt)
- Project Management Institute (USA; largest)

The Project Management Body of Knowledge (PMBOK) is a ‘standard textbook’ for project management (currently 5th edition, 2013) published by the Project Management Institute (PMI), which also offers certifications, e.g. PMP.

The PMBOK recognizes 47 project management processes that fall into five basic process groups and ten knowledge areas that are typical of ‘most projects, most of the time’
The five process groups are:

1. **Initiating**: Define a new project or a new phase of an existing project (e.g. obtaining authorization)

2. **Planning**: Establish the scope of the project, refine the objectives, and define the course of action

3. **Executing**: Complete the work defined in the project management plan to satisfy the project specifications

4. **Monitoring and Controlling**: Track, review, and regulate progress; identify areas where changes are required.

5. **Closing**: Finalize all activities to formally close the project or phase of a project.
The ten *knowledge areas* are:

1. Project Integration Management
2. Project Scope Management
3. Project Time Management
4. Project Cost Management
5. Project Quality Management
6. Project Human Resource Management
7. Project Communications Management
8. Project Risk Management
9. Project Procurement Management
10. Project Stakeholder Management
ROLES OF PROJECT MANAGER

- Co-ordinator;
- Communicator;
- Decision maker;
- Delegator;
- Motivator;
- Negotiator;
- Mediator; and
- Problem solver.
7.1.2 STRATEGY, PROGRAMMES & PROJECTS

- Vision
  - Strategy 1
    - Programme 1.1
    - Programme 1.2
  - Strategy 2
    - Programme 2.1
    - Programme 2.2
- Project 1.1.1
- Project 1.1.2
- Project 1.2.1
- Project 1.2.2
- Project 2.1.1
- Project 2.1.2
- Project 2.2.1
- Project 2.2.2

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Awakening Potential
7.1.3 PROJECT MANAGEMENT LIFE CYCLE

- Phase 1 – the project is conceived (initiated)
- Phase 2 – the development phase (planned)
- Phase 3 – the implementation phase (executed, controlled)
- Phase 4 – the termination phase (closed or commissioned)
<table>
<thead>
<tr>
<th>PHASE 1</th>
<th>PHASE 2</th>
<th>PHASE 3</th>
<th>PHASE 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONCEPT</td>
<td>DEVELOPMENT</td>
<td>IMPLEMENTATION</td>
<td>TERMINATION</td>
</tr>
<tr>
<td>Conceive</td>
<td></td>
<td>Execute</td>
<td>Finish</td>
</tr>
<tr>
<td>Gather data</td>
<td>Appoint key team members</td>
<td>Set up:</td>
<td>Finalise project deliverables</td>
</tr>
<tr>
<td>Identify need/problem analysis</td>
<td>Conduct studies</td>
<td>• Structures</td>
<td>Review and accept</td>
</tr>
<tr>
<td>Establish:</td>
<td>Develop scope</td>
<td>• Communications</td>
<td>Hand over</td>
</tr>
<tr>
<td>• Goals and objectives</td>
<td>Establish:</td>
<td>Motivate team</td>
<td>Evaluate project</td>
</tr>
<tr>
<td>• Stakeholders</td>
<td>• Master plan</td>
<td>Provide detailed technical requirements</td>
<td>Document results</td>
</tr>
<tr>
<td>• Risk level</td>
<td>• Budget, cash flow</td>
<td>Establish:</td>
<td>Release/redirect resources</td>
</tr>
<tr>
<td>• Strategy</td>
<td>• Work breakdown structures (WBS)</td>
<td>• Schedules</td>
<td>Reassign project team</td>
</tr>
<tr>
<td>• Potential team</td>
<td>• Policies and procedures</td>
<td>• Info control systems</td>
<td></td>
</tr>
<tr>
<td>Estimate of resources</td>
<td>Assess risk</td>
<td>Procure goods and services</td>
<td></td>
</tr>
<tr>
<td>Review alternatives</td>
<td>Present project brief</td>
<td>Execute work according to schedules</td>
<td></td>
</tr>
<tr>
<td>Present proposal</td>
<td>Obtain approval to proceed</td>
<td>Direct/ monitor/ forecast and control:</td>
<td></td>
</tr>
<tr>
<td>Obtain approval for next phase</td>
<td></td>
<td>• Scope</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Quality</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Time</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Cost</td>
<td></td>
</tr>
</tbody>
</table>
Given that some projects are both complex (many unknowns) and complicated (high level of detail and perhaps difficulty) it is useful to recognise that as the project moves through the project phases that the cost of change increase while the ability to influence project success decreases.

Both the levels of complexity and complicatedness need to be managed earlier rather than later.

And, where complexity has the possibility to threaten the success of the project, careful consideration must be given to the management of this, i.e. through risk analysis.
7.2.1 PROCESS OF PROBLEM ANALYSIS

- Problems can be analysed by using various tools. We have selected two such tools for discussion. They are:-
  - Problem tree (‘root cause’) analysis; and
  - Fishbone (‘root cause’) analysis.
Problem tree

CORE PROBLEM
(PRIORITYED CONFLICT)
Encroachment into protected area

ROOT CAUSES
- Insufficient natural resource base
- Disputed land ownership
- Weak PA law enforcement
- Displacement of groups outside PA
- Rising population pressure
- Incompatible land uses
- Poor remuneration of PA staff
- Ethnicity and rivalry

EFFECTS
- Loss of PA revenues
- Polarization of ethnic groups
- Loss of biodiversity
- PA-community tensions
- Human-wildlife conflicts
Fish Bone (Ishikawa) – why? why? why?
Categories of Causes

• **The 5 P’s:** people, product, place, price, promotion (distribution)

• **The 6 M’s:** methods, machines, materials, manpower, measurements, Mother Nature (the environment)

• **The 7 S’s:** strategy, structure, systems, shared values, skills, style and staff
7.2.2 GENERATING PROJECT OPTIONS

Root cause → Problem Analysed → Creative (divergent thinking) → Full Range of Options Identified

Brainstorming

Cost-benefit analysis/financial analysis → Analytical (convergent thinking) → Decision Taken
7.2.3 IDENTIFYING THE ‘RIGHT’ OBJECTIVE

- Cost-benefit analyses are used to determine, systematically and rationally, the best project option from a range of possible options.
- The analyses must identify both tangible and intangible costs and benefits.
- Financial considerations:
  - Net present value (NPV);
  - Internal rate of return (IRR);
  - (Discounted) payback period (DPP); and
  - Profitability index (PI).
7.3.1 PROJECT TEAMS

Characteristics of successful teams

- The team leader has an appropriate management style for the project, and is not challenged by other team members;
- There is a “chairman type person” who always encourages all the team members to contribute (the chairman is not necessarily always the project manager);
- At least one member of the team generates innovative ideas as a means to solving problems;
- There is a range of mental abilities;
- There is some flexibility in the team; and
- There is a spread of personalities, which gives the team a balanced outlook.
Stages of team development

**Forming**
Team acquaints and establishes ground rules. Formalities are preserved and members are treated as strangers.

**Storming**
Members start to communicate their feelings but still view themselves as individuals rather than part of the team. They resist control by group leaders and show hostility.

**Norming**
People feel part of the team and realize that they can achieve work if they accept other viewpoints.

**Performing**
The team works in an open and trusting atmosphere where flexibility is the key and hierarchy is of little importance.

**Adjourning**
The team conducts an assessment of the year and implements a plan for transitioning roles and recognizing members' contributions.

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*Awakening Potential*
7.3.3 CO-ORDINATING THE TEAM

- Team members need to know how their work is linked together by participating in the development of project plans and by committing to their section of the project.
- Scope, quality, budget and schedules, for example, should be clearly defined, and each team member should have the same vision (understanding) of the project outcomes.

- Healthy conflict should be encouraged to avoid “groupthink”. It can force people to confront possible defects in a solution and choose a better one …

Bombastically ...

- “Organizational practices also encourage optimism ... Organizations also actively discourage pessimism, which is often interpreted as disloyalty.
- The bearers of bad news tend to become pariahs, shunned and ignored by other employees. When pessimistic opinions are suppressed, while optimistic ones are rewarded, an organization’s ability to think critically is undermined.
- The optimistic biases of individual employees become mutually reinforcing, and unrealistic views of the future are validated by the group”
Or alternatively …

**How long will it take to fix the bugs in our control management software?**

**Do you want a realistic estimate that will ruin your day, or a lie that will allow your ignorance and your happiness to lock arms and square dance to the next cubicle?**

**That second option sounds festive.**

**I’m a pleaser.**
7.5.3 PROJECT TIME CONTROL

• How long does each activity take? (e.g. calculated using *PERT)
• What is the longest (slowest) path in your network diagram? This is your ‘critical path’ defining the quickest path to completion
• Which activities fall along this critical path? These are the critical activities
• When a risk delays a critical activity, it causes ‘drag’ (i.e. slows down the whole project)
• Non-critical activities don’t directly affect the core timeline, and can have ‘float’ or ‘slack’, which means any delays don’t directly affect the whole project
When you want to estimate how long any particular project activity will take, you should:-

- Make an **optimistic** estimate (‘If everything goes right first time, how long would this take …?’)
- Make a **realistic** estimate (‘If most things go right, and a few things go wrong, how long would this take … ?’)
- Make a **pessimistic** estimate (‘If everything that can go wrong, does go wrong, how long would this take …?’)
- Then combine \((1 \times \text{optimistic}) + (4 \times \text{realistic}) + (1 \times \text{pessimistic})\) and divide by 6 for PERT estimate
- **Note:** The gap between (a) optimistic and realistic is usually smaller than the gap between (b) realistic and pessimistic, which is normal
**Examples of PERT time estimate calculations**

\[ \text{Expected time} = \frac{\text{Opt. (O)} + (4 \times \text{Normal (M)}) + \text{Pess. (P)})}{6} \]

<table>
<thead>
<tr>
<th>Activity</th>
<th>Predecessor</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Opt. (O)</td>
</tr>
<tr>
<td>A</td>
<td>—</td>
<td></td>
<td></td>
<td>2</td>
<td>4</td>
<td>7</td>
<td>4.17</td>
</tr>
<tr>
<td>B</td>
<td>—</td>
<td></td>
<td></td>
<td>3</td>
<td>5</td>
<td>9</td>
<td>5.33</td>
</tr>
<tr>
<td>C</td>
<td>A</td>
<td></td>
<td></td>
<td>5</td>
<td>8</td>
<td>15</td>
<td>8.67</td>
</tr>
<tr>
<td>D</td>
<td>A</td>
<td></td>
<td></td>
<td>3</td>
<td>6</td>
<td>11</td>
<td>6.33</td>
</tr>
<tr>
<td>E</td>
<td>B, C</td>
<td></td>
<td></td>
<td>6</td>
<td>9</td>
<td>17</td>
<td>9.83</td>
</tr>
<tr>
<td>F</td>
<td>D</td>
<td></td>
<td></td>
<td>3</td>
<td>4</td>
<td>8</td>
<td>4.50</td>
</tr>
<tr>
<td>G</td>
<td>E</td>
<td></td>
<td></td>
<td>4</td>
<td>7</td>
<td>12</td>
<td>7.33</td>
</tr>
</tbody>
</table>
7.5.4 SCHEDULING

Pages 143 – 146 in textbook

- **Project scheduling** is the conversion of work breakdown structures and logical sequencing into an achievable methodology for their completion: it creates a timetable and reveals the logic that relates project activities to each other in a coherent fashion.

- **Gantt charts** (also known as ‘project barcharts’, ‘timebar schedules’, etc.) are the most common tools for scheduling project information.

- Gantt charts have been automated in almost every available PRM software package (resulting in many different styles)
### Explanatory layout of Gantt Chart

**Project Summary Task:** Special task identifying entire project

**Summary Task:** Any with lower-level subtasks

**Recurring Task:** Task or event that recurs with regular timing (e.g., status meeting)

**Split Task:** Task with planned pause for specific period of time.

**Work Task or Work Package:** Lowest task in the hierarchy (where the work actually gets done)

**Milestone Task:** Event occurrence at a specific point in time

<table>
<thead>
<tr>
<th>WBS</th>
<th>Task Name</th>
<th>Duration</th>
<th>Start</th>
<th>Finish</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Generic Project for Basic Overview</td>
<td>151 days</td>
<td>11/1/10</td>
<td>5/30/11</td>
</tr>
<tr>
<td>1</td>
<td>TOP LEVEL TASK A</td>
<td>151 days</td>
<td>11/1/10</td>
<td>5/30/11</td>
</tr>
<tr>
<td>1.1</td>
<td>Second Level Task A</td>
<td>46 days</td>
<td>11/4/10</td>
<td>12/31/10</td>
</tr>
<tr>
<td>1.2</td>
<td>Third Level Task A</td>
<td>16 days</td>
<td>11/1/10</td>
<td>11/16/10</td>
</tr>
<tr>
<td>1.3</td>
<td>Third Level Task A</td>
<td>20 days</td>
<td>12/6/10</td>
<td>12/30/10</td>
</tr>
<tr>
<td>1.4</td>
<td>Third Level Task A</td>
<td>8 days</td>
<td>12/20/10</td>
<td>1/2/11</td>
</tr>
<tr>
<td>1.5</td>
<td>Third Level Task A</td>
<td>43 days</td>
<td>12/10/10</td>
<td>2/8/11</td>
</tr>
<tr>
<td>1.6</td>
<td>Third Level Task A</td>
<td>27 days</td>
<td>12/10/10</td>
<td>1/17/11</td>
</tr>
<tr>
<td>1.7</td>
<td>Third Level Task A</td>
<td>8 days</td>
<td>12/20/10</td>
<td>1/2/11</td>
</tr>
<tr>
<td>1.8</td>
<td>Third Level Task A</td>
<td>43 days</td>
<td>12/10/10</td>
<td>2/8/11</td>
</tr>
<tr>
<td>1.9</td>
<td>Second Level Task B</td>
<td>20 days</td>
<td>3/7/11</td>
<td>4/1/11</td>
</tr>
<tr>
<td>2.1</td>
<td>Second Level Task B</td>
<td>53 days</td>
<td>2/23/11</td>
<td>5/6/11</td>
</tr>
<tr>
<td>2.2</td>
<td>Second Level Task B</td>
<td>40 days</td>
<td>3/14/11</td>
<td>5/6/11</td>
</tr>
<tr>
<td>2.3</td>
<td>Second Level Task B</td>
<td>1 day</td>
<td>2/23/11</td>
<td>2/23/11</td>
</tr>
<tr>
<td>2.4</td>
<td>Second Level Task B</td>
<td>20 days</td>
<td>2/25/11</td>
<td>3/24/11</td>
</tr>
<tr>
<td>2.5</td>
<td>TOP LEVEL TASK C</td>
<td>42 days</td>
<td>3/29/11</td>
<td>5/25/11</td>
</tr>
<tr>
<td>3.1</td>
<td>Second Level Task C</td>
<td>15 days</td>
<td>3/29/11</td>
<td>4/16/11</td>
</tr>
<tr>
<td>3.2</td>
<td>Second Level Task C</td>
<td>10 days</td>
<td>3/29/11</td>
<td>4/16/11</td>
</tr>
</tbody>
</table>
Gantt Chart with progress indicators (e.g. shading in the bars, ‘today line’, etc.)

WEEKS: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23

WBS 1 Summary Element 1

WBS 1.1 Activity A
- START-TO-START
- 75% complete

WBS 1.2 Activity B
- FINISH-TO-START
- 67% complete

WBS 1.3 Activity C
- FINISH-TO-FINISH
- 50% complete

WBS 1.4 Activity D
- FINISH-TO-FINISH
- 0% complete

WBS 2 Summary Element 2

WBS 2.1 Activity E
- 0% complete

WBS 2.2 Activity F
- 0% complete

WBS 2.3 Activity G
- 0% complete

TODAY
Example of ProjectLibre Gantt Chart

Add, edit, delete tasks, timeframes (including progress), predecessors, resources, etc.

Gantt Chart with same info automatically develops itself as info is changed